

**SCAFFOLD PLANK END CAP**Background of the Invention

The present invention provides apparatus and methods for protecting wood planks, such as scaffold planks, from wear and tear during use.

5           Scaffold planks typically provide a platform on which construction workers walk and transport equipment. As such, scaffold planks are often subjected to wear and tear from exposure to inclement weather and rough handling. Because scaffold planks are typically used outside, they may be exposed to water for extended periods of time. The planks tend to be particularly vulnerable to deterioration caused by water absorption, as they often include a raw end that exposes the plank's end grain to moisture. A plank's end grain is particularly well adapted for taking up water, so exposure of the plank's end grain to moisture makes the plank vulnerable to cracking, splitting or other water damage, resulting in reduced structural integrity. Furthermore, during the course of ordinary use, scaffold planks may be dropped from significant heights, bumped into each other, or bumped into other construction equipment, resulting in broken or otherwise damaged planks. This wear and tear poses both a safety hazard to the construction crew and an increased expense for the builder. Thus, it is important that scaffold planks retain structural integrity, despite exposure to abusive conditions.

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Previously described methods for protecting wood planks from damage include metal or plastic caps that are fastened to the ends of wood joists

used in external construction. These caps are typically designed to avoid pooling of water at or near the joist's end grain by providing channels in the cap through which water collected near the end grain can be directed away from the joist's end. However, while these caps reduce the amount of water pooled at the  
5 joist's end, these caps are not intended to be waterproof and thus, the end grain is still exposed to moisture.

In addition, previously described joist caps often include outwardly extending wing-like portions adapted to direct downwardly falling water (i.e. rain) away from the cap. While this is appropriate for a joist where  
10 the wood is placed in an upright position, these wings would not effectively prevent damage caused by uptake of pooled or standing water. In addition, since planks are typically placed in a horizontal fashion, the outwardly extended wing-like portions would be less effective in directing rainwater away from the end grain of a scaffold plank. Furthermore, any outwardly extending wing-like  
15 portions could create a dangerous tripping hazard on a horizontal scaffold plank.

Moreover, previously described methods for protecting wood planks from damage have not addressed the need to protect the planks from damage due to wear and tear from dropping and bumping while still providing a safe flat walking surface for construction workers and other users.

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### Summary of the Invention

In one embodiment, the present invention provides a wood plank including a c-shaped protective end cap secured to the distal end of the wood

plank. The end cap includes a spine and tapered sides extending from either side of the spine.

In another embodiment, the present invention provides a protective end cap for use with a wood plank. The end cap includes an elongated c-shaped body having a generally concave curvature along a lengthwise axis of the elongated body.

In a further embodiment, the present invention provides a protective end cap adapted to receive a distal end of a wood plank having a top surface and a bottom surface. In this embodiment, the end cap includes a body having a spine and tapered sides extending from the spine. The end cap normally includes an elongated c-shaped plastic body having an inner surface and an outer surface. The inner surface defines a receptacle for contiguously engaging the distal end of the wood plank. The end cap may include an internal diameter that gradually increases as the sides extend from the spine.

The present invention also provides a method for protecting a wood plank from damage. The method includes shaping an external surface of a distal end of the wood plank and securing an end cap to the distal end of the wood plank. The method further provides that the end cap have a hollow receptacle space with an internal boundary contour having a shape closely adhering to the external shape of the plank.

These and other advantages of the present invention will be more readily understood by reference to the following drawings and detailed description.

#### Brief Description of the Drawings

5 Fig. 1 is a schematic illustration of a wood plank incorporating an end cap according to one embodiment of the present invention.

Fig. 2 is a schematic illustration of the end cap of Fig. 1 disengaged from the wood plank.

Fig. 3 is a side elevation sectional view of the end cap shown in  
10 Fig. 2 taken along line 3-3 of Fig. 2.

Fig. 4 is a schematic illustration of a scaffold plank incorporating an end cap according to an alternative embodiment of the present invention.

Fig. 5 is a schematic illustration of the end cap of Fig. 4 disengaged from the wood plank.

15 Fig. 6 is a side elevation sectional view of the end cap shown in Fig. 5 taken along line 6-6 of Fig. 5.

#### Detailed Description of the Preferred Embodiments

In one embodiment, shown in Fig. 1, the present invention provides a protective end cap 10 adapted to engage the end of a wood plank 40.

20 The end cap may serve, for example, to protect the plank from wear and tear due to water exposure and rough handling.

As shown in Fig. 2, end cap 10 typically includes an elongated substantially c-shaped body 12. The c-shaped body forms a hollow receptacle 14 adapted to receive the distal end of the wood plank 40. For the purposes of the present invention, the term c-shaped will be used to refer to the curvature produced when viewing end cap from a side elevation sectional view, as shown in Fig. 3.

As depicted in Fig. 3, the c-shaped body 12 may be described as including a back or spine 16 from which two arms, 18 and 20 extend. In combination, spine 16 and arms 18 and 20 define the receptacle 14, which includes an inner surface 22 and an outer surface 24.

End cap 10 may be made of any suitable material capable of maintaining the desired shape including, for example, rubber, metal or plastic. Typically, the end caps are used on a mass production scale and thus are preformed prior to attachment to the wood plank. When end cap 10 is made of plastic, such as Acrylonitrile-Butadiene-Styrene (ABS), the end caps may be extruded or injection molded into the desired shape. Alternatively, end cap 10 may be molded, cast or shaped on or around plank 40.

Returning to Fig. 2, wood plank 40 includes a top surface 42, a bottom surface 44, sides 46 and 48, and an end 50. The wood plank may be any wood plank requiring protection from moisture or damage from ordinary wear and tear, including, for example, a scaffold plank. Furthermore it should be understood that while wood plank 40 is referred to as a "plank" for ease of

discussion, the term “plank” includes other forms of lumber, including joists, beams, headers and the like.

Plank 40 may be in the form of solid sawn lumber, or may be an engineered wood product, such as laminated veneer lumber (LVL), sold under the trademark MICROLLAM® by Trus Joist, a Weyerhaeuser business, (Boise, ID), laminated strand lumber (LSL), sold under the trademark TIMBERSTRAND® by Trus Joist, or parallel strand lumber (PSL), sold under the trademark PARALLAM® by Trus Joist. Alternatively, plank 40 may be formed of plywood, waferboard, oriented strand board, or the like.

In one embodiment, best shown in Fig. 3, the end cap 10 substantially contiguously engages wood plank 40 such that no gaps exist between the wood plank and the inner surface 22 of the end cap. The phrase “substantially contiguous engagement” as used herein is therefore intended to include an embodiment in which the wood plank and/or adhesive is in contact with substantially the entire inner surface of the end cap. As will be appreciated, small bubbles or incidental areas of non-contact may be present between the substantially contiguously engaged pieces.

The substantially contiguous engagement may include an adhesive layer 30 applied between the wood plank and the end cap. This adhesive layer may serve both to secure the end cap to the wood plank and as an additional barrier to prevent moisture from reaching the end grain of the plank. Furthermore, the adhesive layer may be used to fill in any spaces or misaligned

regions, such as gap 32, between end cap 10 and wood plank 40, to ensure a substantially contiguous engagement between the two structures.

Additionally or alternatively, arms 18 and 20 may taper along their length as they extend from the end cap's spine, as also shown in Fig. 3. This tapering provides a substantially smooth intersection between end cap 10 and plank 40. This substantially smooth surface at the intersection of end cap 10 and plank 40 eliminates the tripping hazard that would be created if the sides of end cap 10 extended above the surface of the plank.

In some cases it may be desirable to manufacture end caps that are adapted to fit a variety of planks. In this case, or for other reasons, end cap 10 may not fit contiguously onto the end of plank 40. Gaps between the end cap and the plank may be filled in with an adhesive layer, as described above, or may be acceptable for the intended use of the particular plank. For example, if the plank is to be used in an area without significant moisture or if the desire is simply to protect the plank from damage caused by drops and ordinary wear and tear, it may be acceptable for a portion of the end grain to be exposed to moisture.

As described above, end cap 10 may be secured to wood plank 40 by an adhesive layer 30. A suitable adhesive is typically water resistant and able to withstand exposure to the various temperature ranges experienced on a construction site. One suitable adhesive is a polyurethane adhesive such as the

Pliogrip® adhesive systems available from Ashland Specialty Chemical Co. (Columbus, OH).

In some embodiments it may be desirable to shape the distal end of the wood plank. Such shaping may include, for example, removing or rounding off the corners and/or tapering of the distal-most edges of the top and bottom surfaces of the plank. On exemplary shaping is shown in Figs 1-3, while another is shown in Figs 4-6. As shown in Fig. 2, the edges of the plank have been rounded to substantially match the c-shaped inner curvature of end cap 10. Removing or rounding off the corners improves structural integrity of the plank in the event of a fall, as the energy of the fall is dissipated across a greater surface of the board. Furthermore, tapering of the top and bottom surfaces provides a better gluing surface as the exposed side grain receives and retains adhesive more efficiently than the end grain of the wood. Alternative shaping may be performed on the plank for additional functional or aesthetic reasons.

As will be appreciated, the end caps may be designed to match the external shape of the plank. This matching may be done, for example, to maintain the contiguous engagement between the inner surface of the end cap and the outer surface of the plank, as described above.

Figs. 4 - 6 depict an alternative embodiment of the invention. As shown in Fig. 4, in this embodiment, wood plank 140 has been shaped in the



manner described above and end cap 110 has been shaped correspondingly.

As stated above, end cap 110 may be shaped to match the external shape of wood plank 140. As shown in Fig. 5, the lengthwise axis of the elongated body has been given an overall concave shape to conform to the convex shape of the end of plank. For example, the middle section 162 of end cap 110 is straight, to provide for the straight edge of plank end 150. Furthermore, ends 164 and 166 of end cap 110 are angled inward to provide the end cap with an internal boundary contour having a shape closely adhering to the external shape of plank 140. Typically, the degree of inward angle is determined by the angle of the plank's exposed shoulders.

Furthermore, because the top 142 and bottom 144 surfaces of plank 140 are tapered, end cap 110 is formed such that the cap includes an internal diameter that gradually increases as the sides extend from the spine. This gradual tapering may, for example, match the tapering of the plank ends. As best shown in Fig. 6, it can be seen that the diameter at 134 is smaller than the diameter at 136. In this example, the sides 118 and 120 of end cap 110 are also tapered as described above with reference to Fig. 3. The matching tapering of the top and bottom surface of plank 140 and the sides of end cap 110, in combination with the gradual increased diameter of the cap, allow the capped plank to present a smooth and level walking surface for construction workers or other users.

As with the embodiments described above, the end cap may be designed to exactly match the shaped end of the plank, such that when engaged, the inner surface of the end cap is contiguous with the external contour of the plank. Alternatively, a contiguous engagement may be achieved by the addition of an adhesive layer to fill in any gaps or misaligned areas. However, it should be noted that a contiguous engagement between the inner surface of the end cap and the plank may not always be necessary or desirable and that embodiments wherein the end cap is not contiguous with the plank are contemplated by the present invention.

Likewise, it will be understood that the shapes of end cap 110 and wood plank 140 in Figs. 1 - 6 are intended to be exemplary and not limiting. Thus, some embodiments of the present invention may include tapering of the top and bottom surfaces without removing or rounding off the corners or vice versa. In addition, the amount of shaping may be more or less than that shown.

As an example, in a preferred embodiment, a typical scaffold plank might measure, for example 1 1/2 inches thick by 9 1/4 or 9 1/2 inches wide. A suitable end cap for this plank might be approximately 9 1/4 inches in length. The end cap's receptacle might have an opening of approximately 1 1/2 inches at its widest point. Typical curvature along the longitudinal axis of the end cap is shown in Fig. 5 where point "A", might have a radius of approximately 6 1/2 inches, point "B" might have a radius of approximately 4 inches, and point "C" might have radius of approximately 5 1/2 inches. Typical

curvature of the cross-section of the end cap is shown in Fig. 6, where point "D" might have a radius of approximately  $\frac{3}{8}$  of an inch, point "E" might have a radius of approximately  $\frac{1}{2}$  an inch, point "F" might have a radius of approximately  $3 \frac{1}{2}$  inches, and point "G" might have a radius of approximately 3 inches. For an end cap having the above-described specifications, a typical thickness of the region indicated by "H" might be .040 inches, while the thickness of the region indicated by "I" might be .125 inches.

It is believed that the disclosure set forth above encompasses multiple distinct inventions with independent utility. While each of these inventions has been disclosed in its preferred form, the specific embodiments thereof as disclosed and illustrated herein are not to be considered in a limiting sense as numerous variations are possible. The subject matter of the inventions includes all novel and non-obvious combinations and subcombinations of the various elements, features, functions and/or properties disclosed herein. Similarly, where the claims recite "a" or "a first" element or the equivalent thereof, such claims should be understood to include incorporation of one or more such elements, neither requiring nor excluding two or more such elements.

It is believed that the following claims particularly point out certain combinations and subcombinations that are directed to one of the disclosed inventions and are novel and non-obvious. Inventions embodied in other combinations and subcombinations of features, functions, elements and/or properties may be claimed through amendment of the present claims or

presentation of new claims in this or a related application. Such amended or new claims, whether they are directed to a different invention or directed to the same invention, whether different, broader, narrower or equal in scope to the original claims, are also regarded as included within the subject matter of the inventions

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